

8. Stinson, F. S., Williams, G. D., Bertolucci, D., and Noble, J.: Alcohol-related morbidity, 1979-1984. *Epidemiologic Bull* No. 14. Alcohol Health and Research World 11: 56-60, winter 1986/87.

9. Powell, J. W., and Klatskin, G.: Duration of survival in patients with Laennec's cirrhosis: influence of alcohol withdrawal and possible effects of recent changes in

general management of the disease. *Am J Med* 44: 406-420 (1968).

10. Williams, G. D., Dufour, M., and Bertolucci, D.: Drinking levels, knowledge, and associated characteristics, 1985 NHIS findings. *Public Health Rep* 101: 593-598, November-December 1986.

Assessment of the Potential for Surveillance of Alcohol-Related Casualties Using National Hospital Discharge Survey Data

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This article was adapted from a presentation at the International Research Conference: Statistical Recording Systems of Alcohol Problems, held in Helsinki, Finland, Sept. 14-18, 1987.

Synopsis

It is well known that alcohol abuse is significantly involved in the incidence of casualties (that is, accidents and injuries as they are defined for the purpose of coding diagnoses in the International Classification of Diseases). Thus, a study was

conducted of the feasibility of using data from the National Hospital Discharge Survey (NHDS) for the surveillance of alcohol-related casualties. Trends were analyzed over 7 years (1979-85), and results were discussed from three aspects: number and rates for comorbidity of injuries and accidents with alcohol-related diagnoses, percent of alcohol involvement for injuries and accidents, and proportionate morbidity for alcohol-related and nonalcohol-related injuries and accidents.

The incidence of comorbidity and percent of alcohol involvement were found to be relatively low for both accidents and injuries—underreporting being a likely cause. Comorbidity rates over the 7-year period showed no major trends in the rates for injuries that were associated with alcohol use, but the rates for accidents that were associated with alcohol use increased in all but one of the years. Proportionate morbidity as reflected in hospital discharge records with alcohol-related diagnoses showed only small differences by sex and age group (except the 14 to 25 years group) for either injuries or accidents. Only the 25- to 44-year-old group showed a time-trend increase, and that is only for the accident category. For these reasons, we have concluded that data from the NHDS are not currently adequate for use in the surveillance of alcohol-related injuries and accidents.

THE NATIONAL INSTITUTE on Alcohol Abuse and Alcoholism (NIAAA) conducts periodic surveillance of apparent per capita alcohol consumption, mortality from cirrhosis, alcohol-related fatal traffic accidents, and alcohol-related morbidity (1-4). This article presents results from an assessment of the potential of the National Hospital Discharge Survey (NHDS) as an appropriate data source for a new area of surveillance, alcohol-related casualties. It is well known that alcohol abuse is significantly involved in the incidence of casualties, which are

defined for coding purposes as "accidents" and "injuries" in the Ninth Revision of the International Classification of Diseases, Clinical Modification (ICD-9-CM) (5, 6).

The NHDS appears to be a potentially useful source of such data because

- NHDS data are national in scope
- Data collection is ongoing, and new data are published annually
- Definitions, data collection methods, and sam-

'For injuries, males consistently had more than twice as many hospital discharges than females. For accidents, the number of discharges for males was larger than for females, but the difference was not so great.'

pling strategies are consistent from year to year

- The ICD-9-CM (7), which is the basis for coding diagnoses in the NHDS, provides codes for accidents and injuries and for certain alcohol-related diagnoses
- The NHDS provides for coding of multiple diagnoses for each discharge record, allowing for examination of comorbidity of alcohol-related and accident or injury diagnoses.

At the same time, certain characteristics of the NHDS might limit its validity for the purpose mentioned. The NHDS includes data only on persons who are admitted to hospitals; therefore, it excludes data on injuries that (a) are not treated, (b) are treated by a physician on an outpatient basis, (c) are treated in an emergency room, and (d) are not treated because the injury or accident was fatal. In addition, diagnostic codes available in the ICD-9-CM are useful for identifying alcohol-related conditions that are chronic or are associated with chronic alcohol abuse but are not useful for specifying acute alcohol involvement as a contributor to a hospital episode.

These considerations led to the study described here, which explores morbidity from injuries among the population of persons hospitalized with diagnoses that suggest a history of chronic alcohol abuse.

Methods

Data source. Data for this study come from public-use tapes containing NHDS data for the years 1979 through 1985. This period begins with the first use of the ICD-9-CM and ends with the latest data currently available. The NHDS is conducted on an ongoing basis by the National Center for Health Statistics (NCHS) and is based on the review of discharge records from a sample of non-Federal, short-stay hospitals with six or more

beds and an average length of stay of less than 30 days. Each discharge can have up to seven diagnostic codes, allowing for analyses of comorbidity among different diagnoses in the same discharge record. The NHDS does not provide patient identifiers, so an unknown portion of the sampled discharge records may reflect multiple hospital episodes for the same patient(s). Detailed descriptions of the sampling design, data collection procedures, and data collection instruments are published elsewhere (8, 9).

Although the NHDS contains data on discharges for persons of all ages, this study includes data only for discharges of persons ages 14 years and older.

Definitions. The focus of this study is on comorbidity of chronic alcohol-related diagnoses, with diagnoses indicating injuries or accidents. These categories of diagnosis are based on the ICD as follows:

Chronic alcohol-related diagnoses. In this study, hospital discharges were selected as indicating chronic alcohol abuse if they contained diagnoses for any of the following conditions, which are associated with chronic alcohol abuse: alcoholic psychoses (ICD 291), alcohol dependence syndrome (ICD 303, 265.2, 357.5, 425.5, 535.3), cirrhosis of liver (ICD 571, 572.3), and nondependent abuse of alcohol (ICD 305.0).

Injury diagnoses. The ICD-9-CM defines injury diagnoses with codes ranging from 800 through 999. Only ICD 995 (certain adverse effects not elsewhere classified but mostly "due to correct medicinal substances correctly administered") and ICD 996-999 (complications of surgical and medical care not elsewhere classified) were excluded from the injury analyses reported here. These exclusions describe injuries resulting from acts of persons other than the injured person, or are unlikely to be related to the injured person's use of alcohol.

Accident diagnoses. The ICD-9-CM includes a set of "E codes" that are supplementary codes designed to provide information on the external care of injury or poisoning. In this report, references to "accident" diagnoses are intended to be a shorthand for indicating the presence of an E code among the diagnoses appearing on the discharge record. E codes appear on NHDS records with less frequency than injury codes. It is not clear to what

extent this results from the fact that a single E code on a record could apply to multiple injury codes on the same record. It may also be that the information required for providing E codes is not always readily available or that physicians feel less of a need to provide such supplementary information. E codes range in value from E800 through E999. With the following exceptions, all available E codes are included and reported as “accidents” in this study: E849 (place of occurrence—for use with selected other E codes), E870–E876 (misadventures to patients during surgical and medical care), E878–E879 (surgical and medical procedures as the cause of abnormal reaction of patient or later complication, without misadventure at the time of procedure), and E930–E949 (drugs, medicinal and biological substances causing adverse effects in therapeutic use). “Place of occurrence” is omitted because it does not code a specific type of accident. The other omissions are for reasons similar to those discussed earlier for injury omissions.

Levels of aggregation. The NHDS data come from a sample of hospital discharges. As with any sample, estimates of the universe based on sample values are subject to error. The reliability of estimates is a function of sample size. Based on NHDS sampling procedures, NCHS has determined that a minimum of 30 unweighted cases is required for even marginally acceptable reliability. Although overall NHDS sample sizes are large (ranging from 160,000 to 185,000 cases per year for persons ages 14 and older for the period covered by this study), the available sample is often too small for reliability when examining morbidity for specific diagnoses. The problem becomes even more severe in analyses of comorbidity, because the analytical cells must contain at least 30 cases for which two separate target diagnoses appear on the same record.

Data presented in this article have been aggregated across diagnostic categories to obtain reliability of estimates for individual years. Care was taken in the analyses to avoid duplicate counting of individual records when multiple injury or accident codes appeared on the same record. The reader is cautioned that the reports of injury and accident diagnoses are not based on mutually exclusive cases; in fact, the accident cases should constitute a subset of the injury cases given the definition of the E code as a supplementary code.

Comorbidity analyses. The analyses of primary interest in this study are those of comorbidity of alcohol-related diagnosis with accident or injury di-

agnoses—in other words, the incidence with which alcohol-related diagnoses and accident or injury diagnoses appear together for the same discharge record (see fig. 1).

Figure 1. Matrix of the possibilities of comorbidity for an alcohol-related diagnosis in conjunction with an accident (E code) diagnosis

Category	With mention of E code	Without mention of E code	All discharges
With mention of alcohol	A	B	A + B
Without mention of alcohol	C	D	C + D
All discharges	A + C	B + D	A + B + C + D

In figure 1, cell A contains cases where there was both an alcohol-related and an accident diagnosis; this cell contains those cases that show comorbidity for alcohol and accidents. Cell B contains cases with mention of alcohol and no E code, and cell C contains cases with mention of E code and no alcohol. Cell D contains cases where there was no mention of either an alcohol-related or an accident diagnosis.

Analyses of comorbidity are more meaningful if they present results as percents or proportions, rather than as raw numbers. In this study, data are presented using two types of percentage figures: percent of alcohol involvement and proportionate morbidity.

Percent of alcohol involvement. The percent of alcohol involvement shows, for a given diagnosis, the percent of all records with that diagnosis that also had a mention of an alcohol-related diagnosis. Referring to the matrix that is figure 1, this percentage = $100 \left(\frac{A}{A+C} \right)$.

Proportionate morbidity. Proportionate morbidity is a measure of the extent to which a particular diagnosis contributes to overall morbidity for any defined group. In this study there are two basic groups for which proportionate morbidity is calculated. Referring to the above matrix, proportionate morbidity for alcohol-related accidents = $100 \left(\frac{A}{A+B} \right)$ and proportionate morbidity for nonalcohol-related accidents = $100 \left(\frac{C}{C+D} \right)$. The data presented also include alcohol-related proportionate morbidity for discharges separated into groups by sex and by age.

Table 1. Unweighted number of cases with target diagnostic codes, National Hospital Discharge Survey, 1979–85

Year	All diagnoses	All Injuries ¹	All accidents ²	All alcohol	Comorbidity	
					Injuries ¹ and alcohol	Accidents ² and alcohol
1979	178,645	18,567	2,948	6,127	534	153
1980	185,402	18,858	3,322	6,443	611	174
1981	188,099	18,807	3,530	6,595	624	197
1982	178,109	17,751	3,594	6,131	569	192
1983	172,011	16,765	3,523	6,017	566	189
1984	160,981	16,326	3,652	5,901	600	216
1985	162,965	16,322	4,024	6,301	644	252

¹ Excludes ICD 995–999.

² Excludes E849, E870–E879, and E930–E949.

Table 2. Estimated numbers and rates per 10,000 population for comorbidity of chronic alcohol diagnoses with all injuries and all accidents, 1979–85

Year	Injuries ¹		Accidents ²	
	Number	Rate	Number	Rate
1979	90,867	5.13	26,607	1.50
1980	106,578	5.95	29,991	1.68
1981	105,763	5.81	34,007	1.87
1982	100,002	5.44	33,561	1.82
1983	104,104	5.60	35,570	1.91
1984	111,279	5.91	41,614	2.21
1985	113,668	5.96	45,266	2.38

¹ Excludes ICD 995–999.

² Excludes E849, E870–E879, and E930–E949.

Findings

The findings of this study are discussed from three aspects: numbers and rates for comorbidity of injuries and accidents with alcohol-related diagnoses; percent of alcohol involvement for injuries and accidents; and proportionate morbidity for alcohol-related and nonalcohol-related injuries and accidents.

Numbers and rates for comorbidity. One of the purposes of this preliminary study is to assess the frequency with which the target diagnoses (that is, chronic alcohol-related, injury, accident) appear on records in the NHDS. Table 1 presents the number of cases, for each year included in the study, that indicate these target diagnoses, either singly or in combination. It is clear from this table that the NHDS sample size is large. However, the incidence of target diagnoses is relatively small; the incidence of target diagnoses in combination (comorbidity) is substantially smaller. This table also shows that the

incidence of E codes in the NHDS is substantially lower than that of injury codes. To some extent this may reflect the fact that a single E code on a discharge record may explain multiple injury codes. However, it appears that E codes may be underutilized in the NHDS.

Table 2 presents the estimated numbers of discharges that show mention of a chronic alcohol-related diagnosis and an injury or accident diagnosis. The estimated numbers are weighted so that they represent estimates of the national incidence of such diagnoses in the population of discharges from short-stay community hospitals with an average length of stay of less than 30 days. For the period 1979–85, these numbers increased for injuries and for accidents, with a more consistent and greater increase for accidents than for injuries. Rates per 10,000 population for discharges with comorbidity for alcohol and injuries or accidents are also presented in table 2. Figure 2 shows the percent change in these population-based rates over the period of study. This figure indicates that rates for accidents associated with alcohol increased in all but one of the years. Over all 7 years, no major trend appears in the rates for injuries associated with alcohol.

Percent of alcohol involvement. One way of examining comorbidity of chronic alcohol-related diagnoses with injuries and accidents is to look at the percent of alcohol involvement for injury and accident diagnoses. The percent of alcohol involvement for injury diagnoses ranged from 2.62 percent in 1979 to 3.57 percent in 1985. Similar figures for accident diagnoses ranged from 4.89 percent in 1979 to 5.95 percent in 1985. Over the 7 years of this study, these figures generally (but not consistently) increased over time.

Although it is possible that these apparent changes may reflect actual increases in the involve-

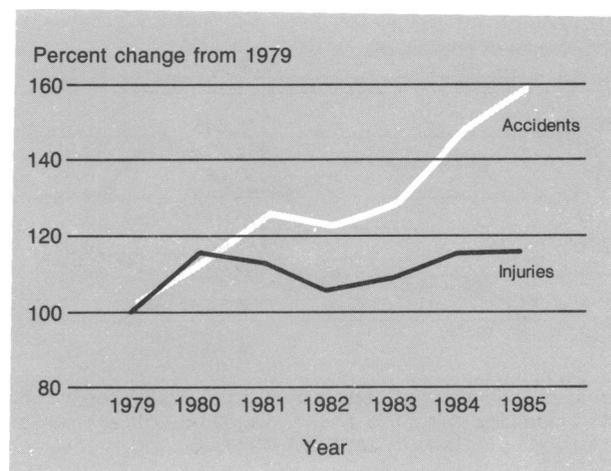
ment of alcohol in injury and accident cases, it is equally likely that they are artifacts of greater attention on the part of physicians to the possibility of alcohol involvement. This second hypothesis is supported by the consistently greater percentage of alcohol involvement in cases with an accident diagnosis. Theoretically, each diagnosis of an injury should be accompanied by a supplementary E code, but this is not seen in the data. The greater apparent association of alcohol with accident codes suggests that those physicians who make the effort to record an E code for injuries also make the effort to record additional, alcohol-related diagnoses.

Proportionate morbidity. Another way to examine comorbidity is to calculate the proportionate morbidity for discharges that mention a chronic alcohol-related diagnosis and for discharges that do not. This statistic provides a measure of the extent to which a particular diagnosis (that is, any injury or accident) contributes to overall morbidity for the group under study. Specifically, proportionate morbidity in this study will indicate the percent of all chronic alcohol-related discharges that also show an injury or accident diagnosis, and the percent of all nonalcohol-related discharges that also show an injury or accident diagnosis. Table 3 shows proportionate morbidity for any injury coded among all nonalcohol-related hospital discharges and all alcohol-related discharges, and proportionate morbidity by sex and age for any injury coded among alcohol-related discharges. Table 3 also shows the same categories of data for any accident. The numerators that provide the basis for the proportionate morbidity data presented in table 3 are contained in table 4.

Consistent with earlier findings, table 3 indicates that injury diagnoses are associated with a larger proportion of alcohol-related and nonalcohol-related discharges than are accident (E code) diagnoses. For injuries, no substantial difference is evident between the proportionate morbidity calculated from alcohol-related discharges and that from nonalcohol-related ones. Nor do there appear to be any consistent trends in proportionate morbidity for injuries.

For accidents, however, table 3 indicates that proportionate morbidity is consistently higher for alcohol-related discharges than for nonalcohol-related discharges. In addition, proportionate morbidity for accidents coded among alcohol-related discharges appears to have increased each year of this study and at a rate greater than is evident for

Figure 2. Percent change in rates per 10,000 population for comorbidity of alcohol with all injuries and all accidents, 1979–85



that coded in nonalcohol-related discharges. There is some increase in the coding of accidents for both groups over the period of study. It is not clear to what extent this may be an artifact of an increased awareness of and use of E codes in hospital records abstracted for the NHDS.

We can think of no reason that this increased use of E codes should be greater among patients who have a chronic alcohol-related condition indicated on their hospital records. If patients with chronic alcohol-related conditions are more prone to accidents, and the incidence of accidents for this group were actually increasing over the period of study, we should expect to see similar patterns and differences in proportionate morbidity for injuries. If recent educational efforts have increased the awareness of alcohol-related problems among health professionals, there may be a concomitant tendency for more diligence in seeking an external cause for injuries in patients who exhibit conditions associated with abuse of alcohol. Patients with chronic alcohol-related diagnoses may be more prone to accidents, and this proneness may be increasing over the period of study; but the evidence provided by the analyses we present is not conclusive.

The following discussion of proportionate morbidity will focus only on the group of patients with an alcohol-related diagnosis. Table 3 presents proportionate morbidity for injuries and accidents coded in alcohol-related discharges for males and females separately. For both injuries and accidents, proportionate morbidity calculated from alcohol-related discharges tends to be slightly greater for females than for males, with the differences being

Figure 3. Proportionate morbidity for injuries associated with an alcohol-related diagnosis, by age, 1979–85

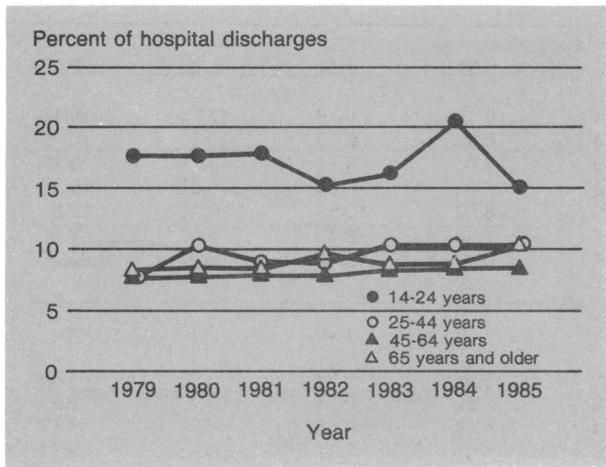
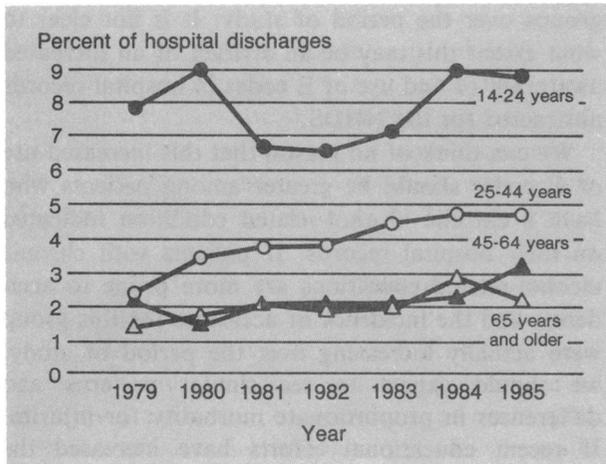


Figure 4. Proportionate morbidity for accidents associated with an alcohol-related diagnosis, by age, 1979–85



larger for accident diagnoses. Reference to table 4 indicates that these proportionate morbidity data are based on more cases for males than for females. For injuries, males consistently had more than twice as many hospital discharges than females. For accidents, the number of discharges for males was larger than for females; but the difference was not so great. In particular, females with chronic alcohol-related diagnoses are more likely than males to have mention of an accident (an E code diagnosis) on their discharge record. Proportionate morbidity for accidents among males with an alcohol-related diagnosis increased over the period of study, approaching levels shown for females in 1984 and 1985.

Figure 3 presents proportionate morbidity for injuries coded among discharges with an alcohol-

related diagnosis for different age groups. Although there are no apparent trends in these data, it is clear that the 14–24 years group is consistently more likely to have an injury code than are any of the older age groups included in this study. As can be seen in table 4, the 14–24 years group consistently accounts for approximately one-half to one-third of the injury diagnoses in alcohol-related discharges in comparison with the 25–44 years and 45–64 years groups.

Figure 4 presents proportionate morbidity by age group for accidents reported in discharges with an alcohol-related diagnosis. Again, the age group with the greatest proportionate morbidity is the youngest, 14–24 years. For accidents, however, the 25–44 years group shows greater proportionate morbidity than either of the two older groups; proportionate morbidity for this group appears to be increasing consistently over the period of study. As table 4 shows, this group has the largest number of discharges with an accident diagnosis in all years but 1979. These data suggest that the group of patients 25–44 years old with an alcohol-related diagnosis is increasing its incidence of accidents. We can think of nothing else that would explain this apparent increase for this group that would not also apply to the older age groups in this study.

Implications for Surveillance

The findings reported are of intrinsic interest, because they throw some light on the comorbidity of injuries and accidents with chronic alcohol-related diagnoses. They also raise some significant questions about the use of the E codes defined in the International Classification of Diseases in coding morbidity. In coding mortality, where injury codes are implicated in the cause of death, the supplemental E codes are given precedence in determining the underlying cause of death (10). This probably means that E codes are recorded with some care on death certificates.

It appears that E codes do not have the same importance in coding morbidity data. Comparisons of morbidity and mortality data demonstrate this point clearly. Using data presented in table 4, we see that the sum of the estimated numbers of alcohol- and nonalcohol-related hospital discharges showing an injury code is 3,441,771 for 1982. For the same year, the comparable estimate for discharges with an accident code is 689,628. These figures demonstrate that, in the NHDS, E codes are used with about 20 percent of the frequency that injury codes are. In contrast, multiple cause

Table 3. Proportionate morbidity for all injuries¹ and all accidents² among hospital discharges, 1979–85

Sex and age group	1979	1980	1981	1982	1983	1984	1985
All nonalcohol-related injuries	10.45	10.14	9.89	9.81	9.44	9.89	9.86
Alcohol-related injuries:							
All	8.67	9.73	9.38	9.12	9.79	10.25	10.19
Males	8.53	9.56	9.09	8.92	9.70	10.16	10.20
Females	9.05	10.17	10.09	9.63	9.99	10.44	10.18
14–24 years	17.77	17.86	18.03	15.20	16.25	20.33	15.25
25–44 years	7.81	10.59	9.33	8.87	10.51	10.48	10.52
45–64 years	7.80	7.96	8.07	7.86	8.18	8.51	8.68
65 years and older	8.42	8.77	8.51	9.42	8.72	8.91	10.36
All nonalcohol-related accidents	1.60	1.68	1.75	1.93	1.90	2.13	2.30
Alcohol-related accidents:							
All	2.54	2.74	3.02	3.06	3.34	3.83	4.06
Males	2.05	2.21	2.76	2.59	2.85	3.77	3.91
Females	3.81	4.06	3.64	4.24	4.50	3.97	4.43
14–24 years	7.85	8.94	6.70	6.56	7.17	8.95	8.77
25–44 years	2.33	3.40	3.74	3.82	4.39	4.71	4.68
45–64 years	2.13	1.49	2.02	2.01	2.11	2.26	3.20
65 years and older	1.39	1.70	2.00	1.91	1.94	2.89	2.19

¹ Excludes ICD 995–999

² Excludes E849, E870–E879, and E930–E949.

mortality data published by NCHS indicate that injury codes appear on 194,351 mortality records for 1982. Mentions of an E code on mortality records occur with the following frequencies: 148,852 for E800–E949; 28,438 for E950–E959; 22,679 for E960–E978; and 3,322 for E980–E999 (11). Even allowing for some duplication of individual death records in these four E code categories and allowing for the exclusion of some E codes in the morbidity data summarized in table 4, it is clear that the frequency of E codes relative to injury codes is greater in mortality data than in NHDS morbidity data. This finding raises questions about the interpretation of E codes recorded in the NHDS.

The numbers reported in this report, along with certain limitations in the NHDS, indicate that data from the NHDS are not currently adequate for the purpose of providing surveillance of alcohol-related injuries and accidents. This is true for the following reasons:

- The NHDS provides data only on persons admitted to hospitals. Alcohol-related injuries and accidents treated in emergency rooms, or treated by private physicians, or not treated, and fatal alcohol-related injuries and accidents are not necessarily recorded in the NHDS. Such omission means that injuries reflected in the NHDS underestimate the true incidence of injuries in the U.S. population. For example, the NHDS data presented in table 4 indicate that there were an estimated total of

3,457,909 injuries among the population ages 14 years and older in the United States in 1981. In that year, the National Health Interview Survey, a household survey conducted by the NCHS, estimates that there were some 51,652,000 injuries among the U.S. population ages 17 years and older (12).

- The data available from the NHDS provide estimates of the numbers of injuries and accidents associated with discharges also showing a diagnosis of a chronic alcohol-related condition. The greater proportionate morbidity for accidents among discharges with an alcohol-related diagnosis may reflect a tendency for those patients to have been using alcohol at the time of the accident, but the data do not support this supposition. The alcohol-related diagnoses included in this study are associated with chronic alcohol abuse and do not implicate the use of alcohol as a proximate cause for any injury or accident recorded.

- The apparent underutilization of E codes in the NHDS means that adequate supplementary information on the circumstances surrounding injuries is not available. From a policy and planning perspective, surveillance of injuries attributed to attempted suicide, motor vehicle accidents, or other categories that place the injury in some context is much more useful than a simple tally of injuries by type (that is, concussion, contusion, open wound) and by location on the body (head, neck, trunk).

These difficulties resolve themselves into two

Table 4. Estimated number of discharges with comorbidity for all injuries¹ and all accidents² among hospital discharges, 1979–85

Sex and age group	1979	1980	1981	1982	1983	1984	1985
All nonalcohol-related injuries.....	3,375,745	3,372,620	3,352,146	3,341,769	3,233,547	3,269,451	3,072,028
Alcohol-related injuries:							
All.....	90,867	106,578	105,763	100,002	104,104	111,279	113,668
Males.....	64,751	74,759	72,669	69,795	72,067	76,631	81,505
Females.....	26,116	31,819	33,094	30,207	32,037	34,648	32,163
14–24 years.....	14,473	13,765	15,943	14,312	13,494	16,880	13,651
25–44 years.....	28,839	41,782	38,663	36,380	42,627	44,101	45,896
45–64 years.....	34,798	36,139	36,569	32,608	32,269	33,273	35,339
65 years and older.....	12,757	14,892	14,588	16,702	15,714	17,025	18,782
All nonalcohol-related accidents.....	517,350	558,688	594,410	656,067	651,172	702,702	715,304
Alcohol-related accidents:							
All.....	26,607	29,991	34,007	33,561	35,570	41,614	45,266
Males.....	15,599	17,291	22,076	20,271	21,143	28,435	31,283
Females.....	11,008	12,700	11,931	13,290	14,427	13,179	13,983
14–24 years.....	6,395	6,889	5,920	6,180	5,952	7,430	7,850
25–44 years.....	8,599	13,434	15,500	15,677	17,811	19,822	20,406
45–64 years.....	9,510	6,784	9,151	8,321	8,309	8,843	13,042
65 years and older.....	2,103	2,884	3,436	3,383	3,498	5,519	3,968

¹ Excludes ICD 995–999.

² Excludes E849, E870–879, and E930–E949.

basic issues. First, as it currently exists, the ICD does not have adequate codes for implicating acute alcohol involvement in morbidity or mortality. This issue has been addressed recently by the Alcohol, Drug Abuse, and Mental Health Administration (ADAMHA) of the Public Health Service, which has recommended the addition of two supplementary alcohol involvement codes for adoption and use in the upcoming 10th revision of the ICD (13). The recommended codes are Y92—Evidence of Alcohol Involvement Determined by Blood Alcohol Content and Y93—Evidence of Alcohol Involvement Determined by Level of Intoxication. With the adoption and use of these codes, the ICD and any record-keeping system based on the use of the ICD will be better able to identify events in morbidity and mortality in which the use of alcohol was proximately involved.

Second, for the purposes of surveillance of alcohol-related injuries and accidents, the NHDS does not provide adequate coverage of all events. The authors are unaware of any data collection effort currently operating that provides the required coverage—primarily because accidents and injuries serious enough to require treatment are treated in such a variety of settings that no one system can capture them all. A solution for this second issue will require considerable thought and expenditure of resources in the development of new data collecting systems. A discussion of these issues and a preliminary model for a data collection

system for surveillance of alcohol-related casualties was presented at a 1985 Symposium for Statistics on Alcohol-Related Casualties, held in Toronto, Canada (14).

References.....

1. Grant, B. F., Zobeck, T. S., and Ng, M-J. C.: Liver cirrhosis mortality in the United States, 1970–85. Surveillance report No. 8. Alcohol Epidemiologic Data System, June 1988.
2. Laforge, R., Stinson, F. S., Freel, C. G., and Williams, G. D.: Apparent per capita alcohol consumption, national, State, and regional trends, 1977–85. Surveillance report No. 7. Alcohol Epidemiologic Data System, Washington, DC, September 1987.
3. Zobeck, T. S., Grant, B. F., Williams, G. D., and Bertolucci, D.: Trends in alcohol-related fatal traffic accidents, United States, 1979–1985. Surveillance report No. 6. Alcohol Epidemiologic Data System, Washington, DC, August 1987.
4. Stinson, F. S., and Williams, G. D.: Trends in alcohol-related morbidity among short-stay community hospital discharges, United States, 1979–84. Surveillance report No. 4. Alcohol Epidemiologic Data System, Washington, DC, January 1987.
5. Roizen, J.: Alcohol and trauma. *In Drinking and casualties: accidents, poisonings and violence in an international perspective*, edited by N. Giesbrecht, R. González, M. Grant, E. Österberg, R. Room, I. Rootman, and L. Towle. Croom Helm, London, 1988, pp. 21–67. In press.
6. Roizen, J.: Estimating alcohol involvement in serious events. Alcohol and Health Monograph. Lexington Books, Lexington, MA, 1982.
7. Commission on Professional and Hospital Activities: The international classification of diseases, 9th revision, clinical modification: Vol. 1, diseases tabular list. Commission on

Professional and Hospital Activities, Ann Arbor, MI, 1978.

8. National Center for Health Statistics: Utilization of short-stay hospitals, United States, 1983, annual summary. Vital and Health Stat [13] No. 83. DHHS Publication No. (PHS) 85-1744, Hyattsville, MD, May 1985.
9. National Center for Health Statistics: Development of the design of the NCHS Hospital Discharge Survey. Vital and Health Stat [2] No. 39, Publication No. (PHS) 1000, Hyattsville, MD, September 1970.
10. World Health Organization: International classification of diseases, ninth revision. Geneva, Switzerland, 1977.
11. National Center for Health Statistics: Public use data documentation: multiple cause of death for ICD-9 1982 data. Hyattsville, MD, 1985.

12. Collins, J. G.: Persons injured and disability days due to injuries, United States, 1980-81. Vital and Health Stat [10] No. 149, DHHS Publication No. (PHS) 85-1577. National Center for Health Statistics, Hyattsville, MD, March 1985.
13. Grant, B. F., et al.: Proposed coding of alcohol's role in casualties. In Alcohol health & research world. National Institutes on Alcohol Abuse and Alcoholism, Washington, DC, Fall 1987, p. 48.
14. Aitken, S., and Zobeck, T.: A proposed model for establishing an alcohol-related casualty surveillance system. In Drinking and casualties: accidents, poisonings and violence in an international perspective, edited by N. Giesbrecht, R. González, M. Grant, E. Österberg, R. Room, I. Rootman, and L. Towle. Croom Helm, London, 1988, pp. 409-422. In press.

Alcoholism Treatment Service Systems: A Health Services Research Perspective

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Synopsis

This article examines the role of health services research in alcoholism treatment. Alcoholism services research has only recently emerged as a self-defined discipline. Alcoholism services research can be grouped into five classifications: a) de-

scriptive studies of resources for alcoholism treatment and of the use or cost of these services, b) estimates of the need or demand for alcohol services in the population or in particular subpopulations, c) studies of the costs or cost-effectiveness of alcoholism treatment or of alternative treatments, d) studies of the possible "cost-offsets" of treating alcoholism, and e) studies that examine strategies for financing and reimbursement for alcoholism treatment. Research is needed to determine how alcoholism treatment services are now delivered, who uses these services, how treatment setting and organization affect service delivery, who pays for alcoholism treatment, and how reimbursement policies affect the delivery of alcoholism services. Research on large-scale social issues is also needed, such as the effects of warning labels appearing on alcoholic beverage containers or estimates of the overall cost to society of alcohol abuse.

RECENTLY, AN ADVISORY BOARD created by Congress to assess national needs for alcohol, drug abuse, and mental health services recommended that research on treatment services should be declared a priority area (1). At the present time, research on alcohol service systems receives a relatively low priority within the Federal Government and in the alcoholism field generally.

A number of important health services research studies have been conducted in the alcoholism treatment area (2), many supported by the National Institute on Alcohol Abuse and Alcoholism (NIAAA). Even so, the field lacks a well-defined sense of goals and methods. This article examines

the concept of health services research as it has been used in other health areas and relates it to alcoholism treatment issues. Included are some possible directions for future research.

History and Definition

The importance of health services research was formally recognized by Congress in 1974, when the Public Health Services Act, one of the principal acts of Congress providing legislative authority for Federal health activities, was amended to create the National Center for Health Services Research (NCHSR) within the Public Health Service (3).